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**TO:** Exam. Ted M. Wang  
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**FROM:** Michael D. Murphy  
**DATE:** August 19, 2004  
**SERIAL NO.:** 09/747,052  
**OUR REF. NO.:** 4015-808

Pages including cover sheet: 5  
**COMMENTS:**

Please see the attached.

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## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Applicant: Ham, III

Serial No.: 09/747,052

Filing Date: December 22, 2000

Docket No.: 4015-808

Title: **Clock Synchronization In A  
Communications Environment**

Examiner: Mr. Ted M. Wang

Group Art Unit: 2634

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Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450**CERTIFICATE OF FACSIMILE**I hereby certify that this fax is being facsimile transmitted to  
Exam. Ted M. Wang at The United States Patent and  
Trademark Office, FAX NO. 703-872-9306 On August 19,  
2004.

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DEBORAH MONDELLO

**SUMMARY OF AFTER-FINAL TELEPHONE INTERVIEW**

Examiner Wang and the undersigned agent discussed the examiner's final rejection of the instant application by telephone today. During the course of that telephone conversation, the undersigned agent argued that the reference used as the basis for the examiner's final rejection arguments did not teach Applicant's invention as claimed, and the examiner ultimately agreed with that assertion. Thus, it is the undersigned agent's understanding that the examiner will withdraw his final rejection based on today's telephone interview, which is further detailed below.

As explained in the telephone interview, Applicant's invention is directed toward improving PLL performance by adapting the loop filter responsive to the average of the

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control values output from that filter. The control values drive a Voltage Controlled Oscillator (VCO), for example. Simply put, the loop filter averages the loop error signal(s) to produce the control values, and Applicant's invention applies an additional, second filtering function to those control values to develop an average value of the control values. That average value is then used as the basis for adapting the loop filter.

For example, if the average values are trending up or down, that is taken as an indication that the PLL has not settled at the desired control point and the loop filter's response (i.e., its bandwidth) may be increased to move the PLL more quickly toward the desired control point. Conversely, if the average values are distributed around some stable mean, that is taken as an indication that the PLL has settled around the desired control point, and the loop filter's response can be decreased (i.e., it can be configured for heavier smoothing to maintain the desired control point). The use of the average of the control values to adapt the loop filter is a feature of all independent claims in the instant application.

In contrast, as discussed in today's interview, the Wilhelmsson reference (U.S. Pat. No 6,353,647) uses an entirely different approach to loop filter adaptation. In Wilhelmsson, the loop filter is adapted according to a predetermined time function, i.e., it is ramped from light to heavy filtering according to predetermined time interval. Wilhelmsson does disclose using the control output of its loop filter as a basis for triggering the start of such timing, but the specification makes clear that this use is based simply on evaluating whether the control value is inside or outside an allowable (voltage) operating range of the PLL's circuit elements. In other words, Wilhelmsson

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teaches that one should not start running the filter adaptation timer if the PLL is so far out of lock that its circuit elements are saturated.

The above operations are clearly explained in Wilhelmsson, with a particularly good explanation given at col. 12, lines 11+. One also may refer to Fig. 12 of Wilhelmsson, which depicts the feedback of the filter's control output for use in determining whether that output is or is not within the PLL circuit's operating voltage range.

Thus, as emphasized by the undersigned agent in today's conversation, and as admitted by Examiner Wang, Wilhelmsson does not teach (or even hint at) adapting the loop filter of a PLL circuit based on averaging the control values output by that circuit. Applicant's instant invention does teach that process, wherein the filter's control values are themselves subjected to additional filtering (i.e., averaging), and wherein the average values thereby obtained are used as the basis for determining how the loop filter should be adapted.

As such, it is the undersigned agent's understanding that Examiner Wang will withdraw his final rejection, and he looks forward to receiving notice from the examiner that such withdrawal has been made. If there are any remaining issues that would prevent allowance of the instant application with all pending claims, the examiner is encouraged to call.

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Respectfully submitted,

COATS & BENNETT, P.L.L.C.

Dated: August 19, 2004



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